

LESSON

12

Summing Up Sequences

Opening Activity

Throughout this unit, you've worked with a variety of sequences. Now it's time to put all of these ideas together. With your group, you'll each create a foldable containing a summary of all the ideas from this unit.

You will need: foldable template, Sequences Summary handout, scissors, tape or glue stick, colored markers or pencils

1. A. Cut along the dotted (.....) lines of the Foldable template. Then fold along the dashed (----) lines.
B. Cut apart the Sequences Summary handout and glue or tape into the correct area of the template.
C. Use colored markers or pencils to emphasize ideas, color-code concepts, or highlight key words. This is a learning tool for you to use, so it is important to personalize it.

Which Mathematical Model Is the Best?

Throughout this unit, we've been looking at the differences between arithmetic and geometric sequences, along with their related functions—linear and exponential. These two types of functions are some of the most useful for modeling trends in data. Let's look at a few examples.



Will the new iPhone sales be huge?
September 17, 2017

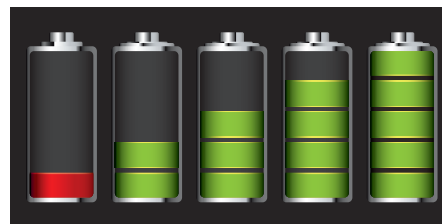
Apple just announced their new, 10th anniversary, iPhones, the iPhone 8 and the iPhone X. These phones will soon be in stores, the iPhone 8 comes out on September 22, 2017. The iPhone X is available as of November 3rd. What will their record sales be like this time? How many iPhones will they sell?

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Source: <https://www.yummymath.com/2017/will-the-new-iphone-sales-be-huge/>

- Complete the *iPhone 6s Opening Weekend Sales* Desmos activity. Your teacher will give you the class code.
- Which model was the best for the iPhone sales? Were you surprised?

One problem that is common with cell phones is their battery life. In this activity, you'll use modeling to predict how long it will take for a smartphone to reach full charge. You will also interpret the parameters of their equation in context.



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- Complete the *Charge!* Desmos activity. Your teacher will give you the class code.
- Which model was the best for the phone charging? Were you surprised by any of the data?

Lesson Summary

What can mathematical models help you do?

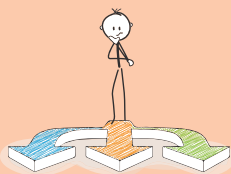
Explain



Predict



Decide

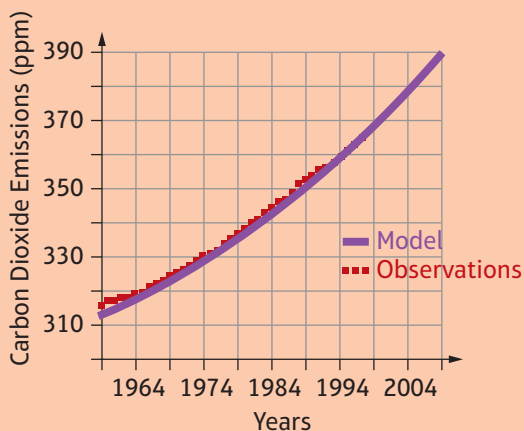
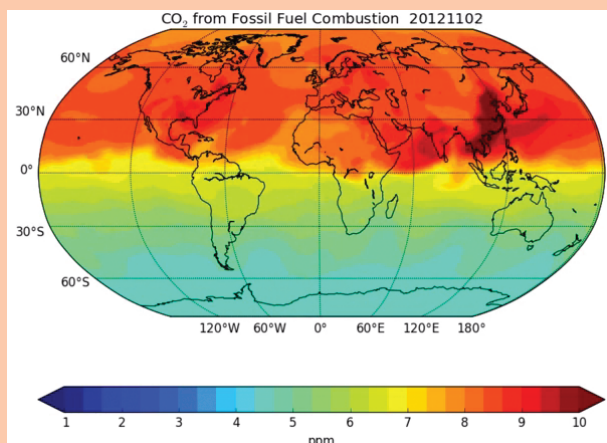


Understand



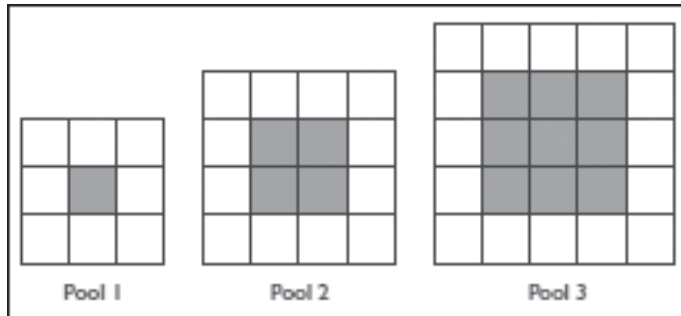
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Sample Model of Real World Data



Source: Trends in Atmospheric Carbon Dioxide, NOAA

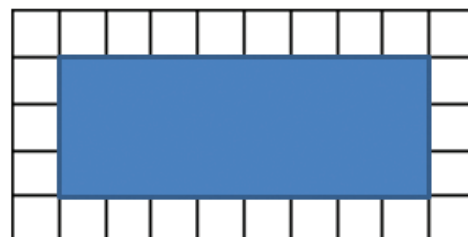
2. Tat Ming is designing square swimming pools. Each pool has a square center that is the area of the water. Tat Ming uses gray tiles to represent the water. Around each pool there is a border of white tiles. Below are pictures of the three smallest pools that he can design with the gray tiles for the interior and white tiles for the border (Ferrini-Mundy, et al., 1997).



- A. What are the variables in this situation? What quantities are changing?
- B. How are the variables related? As one variable increases, what happens to the other variable?
- C. How can you represent the relationship between:
- the pool number and the white tiles,
 - the pool number and the gray tiles, and
 - the pool number and the total number of gray and white tiles, using words, tables, graphs, and symbols?

- D. Are any of the relationships in Part C functions? If so, what types of functions are they (e.g., linear, quadratic, exponential)? How do you know? Explain.

- E. **Challenge** What if the pool is a non-square, rectangle? Explain in words, with numbers or tables, visually, graphically, and with symbols, the number of tiles that will be needed for pools of various lengths and widths.

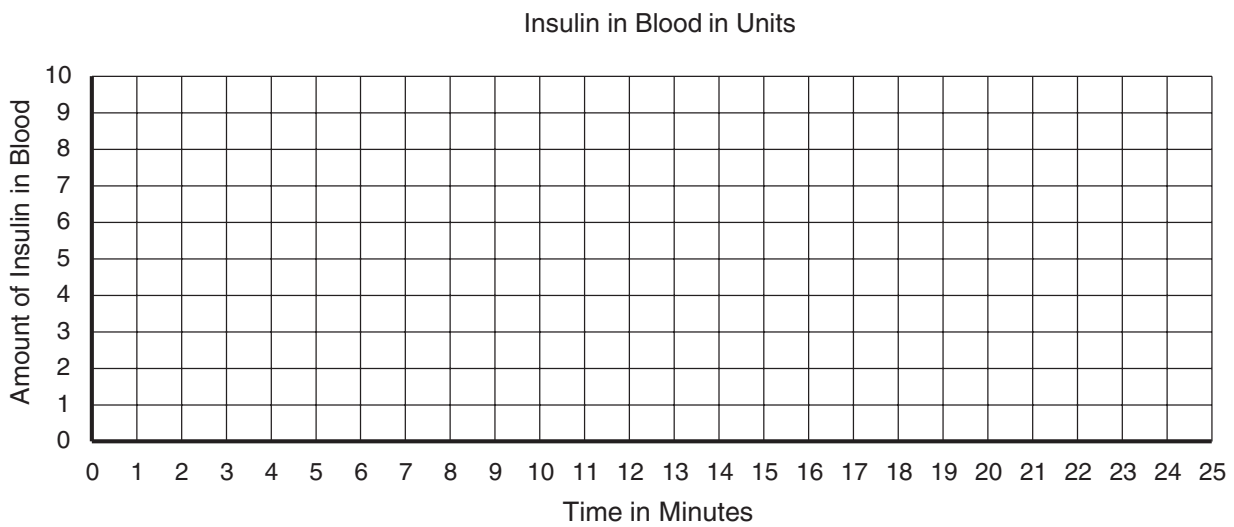


3. The table below gives the amount of insulin in Bob’s blood over a period of about 20 minutes.

Time in Minutes	0	1	1.5	2	4.5	7.5	10.5	13.5	16.5	19.5
Insulin in Blood in Units	10	9.5	9.3	9.0	7.9	6.8	5.8	5.0	4.3	3.7

A. Use the data to determine an appropriate model for this data.

B. Graph the data to see if there is a pattern.



C. Did your choice of a model change based on the graph? Explain.

D. What would you expect the amount of insulin to be at 24 minutes? Explain how you got your estimate.